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Economic analysis of potato sale in zero and one fork restaurants of Lubumbashi in DR Congo

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Abstract: The present study was aiming to asses economically the potato sale in two different categories of Lubumbashi restaurants (category: 0 to 1 fork restaurants). Specifically, daily consumption was to be quantified, to determine the unit price comparing the margin profit and the financial profitability achieved by shareholders. For achieving this goal, a survey was conducted to seventy restaurant owners located in Lubumbashi, Kamalondo and Kenya township. The restaurant lists established according to the provincial tourism ministry categorization was used to find the concerned restaurant. Data on the sociodemographic features, the input and output costs, the unit price, the origin of potatoes, etc. were collected using a survey questionnaire. The result showed that the daily consumption of potatoes in these restaurants was nearly the same, although the restaurant category could be different. On the contrary, in spite of the profitability of the potato sale in these two types of restaurants, the owners of one fork restaurants are chalking up the high profit margin in comparison of those of zero fork restaurants, and then the potato sale in one fork restaurants is indicated to be more profitable. However, the difference of the profitability rate between these two restaurant categories could be due to several factors including the unit price, invested capital and the purchasing power of consumers.

Keywords: Economic assessment, Potato, Zero to one range restaurant, margin profit.

1. Introduction

The potato plays a key role in the global food system, and is a main non-cereal food in the world. Its world production in 2007 was evaluated at more than 300 million tons for 18.5 million of hectares. Since 1991, there is a high increase of potato production in developing countries, whereas the production is stable with a slight trend of decrease. It is in Africa where the highest increase of potato production has been registered in this last decade; over 50% (Vanderhofstadt et Jouan, 2009). However, in tropics, the production zones are frequently observed in high lands. The potato is therefore cultivated in all the high plateau of east Africa (Kenya, Ethiopia, Uganda, Tanzania, etc), but also in Central Africa (Mount Cameroun, Great lakes Region, etc.); and in these Regions of high potential of production, potatoes are constantly taking a great part in diet (Rolot et Vanderhofstadt, 2014). In DR Congo, potato takes the third place among the root crop (after sweet potato and cassava), and is the main root crop in High land region. Although the 90% of national production are from Kivu where the crop is being cultivated in the whole year and is regularly consumed, this crop ois also found Province Oriental, in Katanga and at Bas-Congo (FAO, 2009). As the people consumption model evolve on time and is influenced by numerous factors, especially, the income, the price, individual preferences and belief, people's culture, geographic, environmental and socio-economic factors (Padilla & al., 2005); potato is a product differently consumed in DR Congo, and is then by its supply and its price. In the East it is largely consumed because a kilo varies between 0.3 to 0.5 $. In return, the household consumption of potato is largely reduced in Lubumbashi for its market price around 3$ a kilo. However, potatoes are still very much appreciated by

Lubumbashi consumers, but are served as a glamorous party dish (CDE, 2012). According to Pierre petit (2001), Starchy food (cassava and potato) and cereals (wheat and rice), both combined represent only 10% of food household expenses of Lubumbashi people, for their diet is leaning to Fufu (Bukari a food done from maize flour) and vegetables. However the potatoes are seldom found in Lubumbashi household dishes, they are constantly present in the restaurants where they are being served as glamorous dishes and whose consumption should be subject of an assessment. Several studies have been already conducted in this potato area, but no one conducted its consumption in restaurants. Then, this study aimed to assess economically the potato sale consumed in zero to one fork restaurants in Lubumbashi. Specifically, it was about quantifying the daily consumption of potato in these restaurants, to determine the unit price, to compare the profit margin and the financial profitability achieved by actors involved in this business.

2. Environment, material and methods

2.1. Environment

Commonly called "copper capital", Lubumbashi is the capital city of the Mining province of Haut-Katanga, and is the second city of DR Congo after Kinshasa. Created in 1910, Lubumbashi by that time Elisabethville, owes its origin and development to the discovery of great amount of copper ore deposit and their exploitation by Upper Katanga Mining Union (UMHK) (Kamena & al., 2004 and Mpundu & al., 2013). The city is located in the south- east of the country, at 11°40' south latitude and à 27°29' east longitude, and the urban area is at 1200 and 1300 m altitude. According to Koppen classification, Lubumbashi has CW6 climate type with the rainy season going from November to March and the dry season from April to October. The rainfall goes up to 1270 mm, with extreme values reaching 1770 mm, the mean annual temperature of 20°C (Malaise, 1990). In the year, the minimum of temperature is 8°C and the maximum of 32°C (Vraken, 2010). Currently the city is subdivided into 42 districts spread over 7 townships: Lubumbashi, Kenya, Katuba, Kampemba, Ruashi, Kamalondo and the annex commune. 70% of its population lives below the poverty line (Nkuku & Remon, 2006). The local economy is mainly sustained by mining (Ministry of plan, 2005). It is noticeable that the economic function is considerable and distributed in these different townships, but is more pronounced in the Lubumbashi Township which is the mirror of the town because of its high urbanization. Presently, Lubumbashi counts 30 markets (Mujinga & al, 2009). This study focused to the shareholders owning restaurants of Zero to one range category.

2.2. Material and methods

These survey data were collected from restaurants in three Lubumbashi communes: Kamalondo, Kenya and Lubumbashi. Lubumbashi city is characterized by a coexistence of semi-rural peripheral zones with agricultural vocation and central zones highly urbanized with great infrastructures (Tshomba, 2015). However, these urban zones are mainly concentrated in these three communes and are areas mostly preferred by traders who are engaging themselves in businesses which generate income. The zero and one fork restaurants are the most representative in this part of the city and are more frequented by all people strata. This aspect of things is among the reasons which conducted our choice for on these three townships. The three, four and five fork restaurants were excluded on the fact that they are mostly visited in times of great feasts and occasional events such as: Easter, New Year, Christmas, wedding, birth day's celebrations, Saint Valentine… These commercial establishments are classified according to the ministerial ordinance 005/CAB/MIN/TOURISME/MWB/2015 of May 21st relating to restaurant regulation in Republic Democratic of Congo modifying and completing the ordinance 075/CGT/CGT/BCO/77 of November 30th 1977 relating to restaurant regulation in Republic of Zaire; at its first article of this ordinance (Official journal of the Republic Democratic of Congo, August first 2015). Two types of restaurants are found in DR Congo: authorized restaurants not classified, called restaurants without fork and authorized and classified restaurants, called restaurants with fork. The zero fork restaurants are those having a building, furniture, good quality facilities and installation, easy accessibility, dining room doubled with a bar (having tables of two to eight chairs), distinct kitchen and toilet for gents and ladies with proper commodities and a legal status for personnel. The one fork restaurants add to all these criteria the high quality and esthetics, a dining hall doubled with a bar with a capacity to receive three tables and twelve chairs, toilets (one toilet for gents and two for women). Based on the above criteria, the provincial ministry of tourism identified and categorized all the restaurants in Lubumbashi. This list restaurant category was used in this study to find and differentiate the zero and one fork restaurants in the area. The survey was conducted in May and July 2018 and realized to 70 restaurant owners located in three townships. Data were collected through a survey

questionnaire, open or closed question. The questionnaire was focused on the following parameters: sex, age, marital status of people undergoing a survey, unit price, daily consumption of potato, potato supply place, the capital invested by shareholders, the incomes… Data were captured in excel and statistical treatments done with R software version 2.17.0. The percentage, average, standard deviation, the minimum and the maximum were used in the interpretation of the statistic descriptive elements. For deduction of the achieved profit, the following formula was used: Profit=income-total investment [18]. The financial profitability by the ratio of the achieved profit and proper capital invested; and the profitability rate by the ratio: Profitability rate $= \frac{\text{achieved profit}}{invested\ \ capital} X100\%$. The t student test was used to compare the unit price, the profit margin and the financial profitability between these two categories of restaurants. The ANOVA was used to compare the profit achieved by actors in three townships concerned. Moreover, the difference was significant for **P-value 0.05;** and the average comparison by Tukey test.

3. Results and Discussions

3.1. Resultats

3.1.1. Sociodemographic characteristics of respondents

Both discontinuous and continuous variables allow characterizing the sample surveyed. The table 1 presents the descriptive statistics of qualitative variables and table 2 descriptive statistics for quantitative variables.

Table1. Descriptive statistics of qualitative variables

Variables	Modalities	Absolute Frequencies (Relative Frequencies)
Sex	Male	11 (16)
	Female	59 (84)
Etat civil Civil status	Singles	11 (16)
	Married	55 (79)
	Divorced	1 (1)
	Widowe	3 (4)
Education level	None	1 (1)
	Primary	4 (6)
	Secondary	54 (77)
	Superior	11 (16)

Most of respondents were women; this indicates that the restaurant businesses in the study area are under the women's ownerships. Among these women most of them are married, and then followed by singles, widows and divorced. Concerning education level, more than a half have a secondary level and more than a quarter a higher level.

Table 2. Descriptive statistics of quantitative variables

Variables	Minimum	1st quartile	median	Average	3rd quartile	Maximum
Age	17	26,25	29	31,99±8,2	35	61
Length of service	1	2	3	3,56±2,19	4,75	14

Concerning the supply of restaurant owners in potato, 44% of the respondents were from Kenya market (in Kenya township), 33% from Kasumbalesa (at the border of Zambian republic), 13% from Kipushi (a town located at 30km of Lubumbashi), and then 10% buy their potatoes in the M'zee market (in Lubumbashi township). Most of restaurant owners buy their potatoes in Kenya market (in Kenya township) for reason that it is a market where all products from farms are sold in wholesale and retail, even potatoes coming from Tanzania, Zambia and South Africa are sold in this market.

The figure 1 here below shows that the average quantity of potatoes sold per day in zero fork restaurant (four 0) and one fork restaurant (four 1) are respectively 8.21±6.85 kg and 11.15±4.23kg. The student test shows that differences are not significant (p-value = 0.06). Nevertheless, it has been observed that the quantity of potatoes consumed in one fork restaurants were slightly higher.

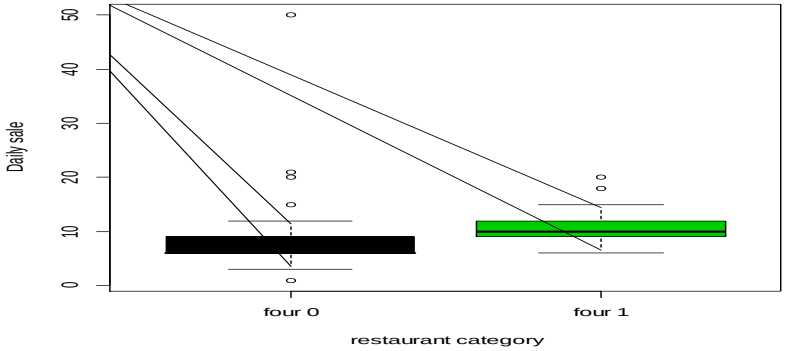

Figure 1: Daily consumption by type of restaurant

Regarding the profit margin, the figure 2 there is relationship between the mean profit and the category of the restaurants, the student test showed differences highly significant between the two types of restaurants (P = 0.00007). The mean profit of 50881.89 ± 60824.39CDF is achieved in restaurants of Zero fork (four 0), and 143589.77 ± 59045.66CDF for those of one fork (four 1).

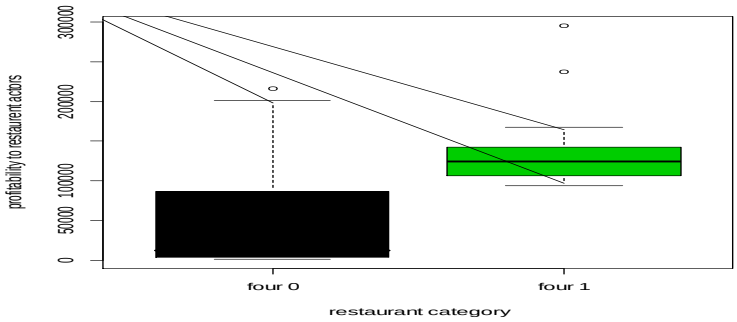

Figure 2. Weekly profit by restaurant types

Results on the influence of restaurant category on the unit price as displayed in the figure 3 below, differences between averages were highly significant according to the student test (p-value= 0.00002). This implies that the price of a dish of 1kg of potatoes in one fork restaurants (3961.53 ± 746.70 CDF) was very high compared to the price of one kg set in Zero fork restaurants (2659.82 ± 713.8 CDF).

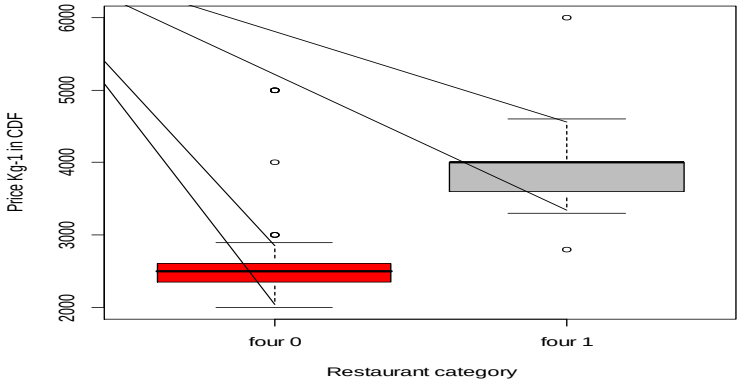

Figure 3: Unit price (kg) by restaurant type

A comparative analysis of the costs invested by the actors involved in the sale of potatoes consumed in Lubumbashi restaurants revealed that, the restaurant owners in one fork restaurants invest more than those of zero fork category. And the student test reported significant differences in the averages of costs invested by the actors (p-value = 0.036). The same applied for the revenues realized by the actors, those of one range realize very higher benefits compared to those of zero fork (p-value = 0.0008). This shows that the revenues realized vary according to the size of the capital invested by the actors (figure 4 and 5).

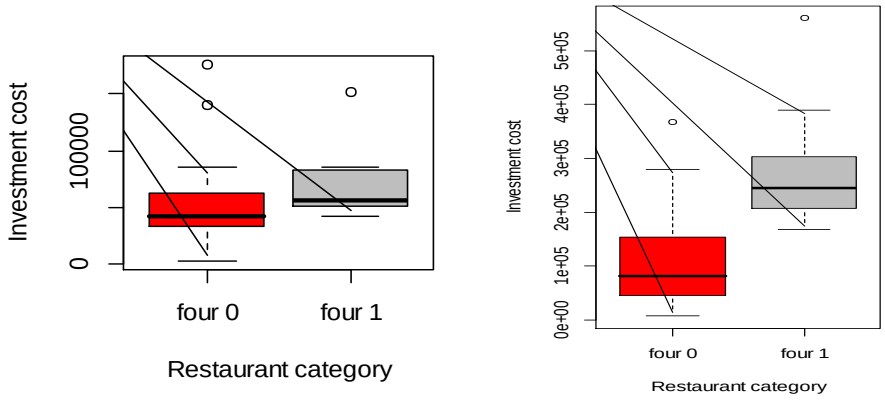

Figure 4 and 5. Total investment cost (left) and revenues by type of restaurants (right)

Figure 6 revealed that the restaurant's location in one or the other township exerted influences on the profit achieved by the restaurant owners in potato dish sale. Although the lowest profit is almost the same in these three communes, it was higher in Lubumbashi commune in comparison to other townships. And the variance analysis showed the highly significant differences with a P-value of 0.002. Potato sellers at restaurants in Lubumbashi commune (l shi) can make mean profit of 83220.90 ± 57869.43 CFD per week, but the other communes, Kamalondo (Kamal) and Kenya, could respectively realize the profits of 41167.32 ± 62853.72 CDF and 26546.68 ± 38744.12CDF per week.

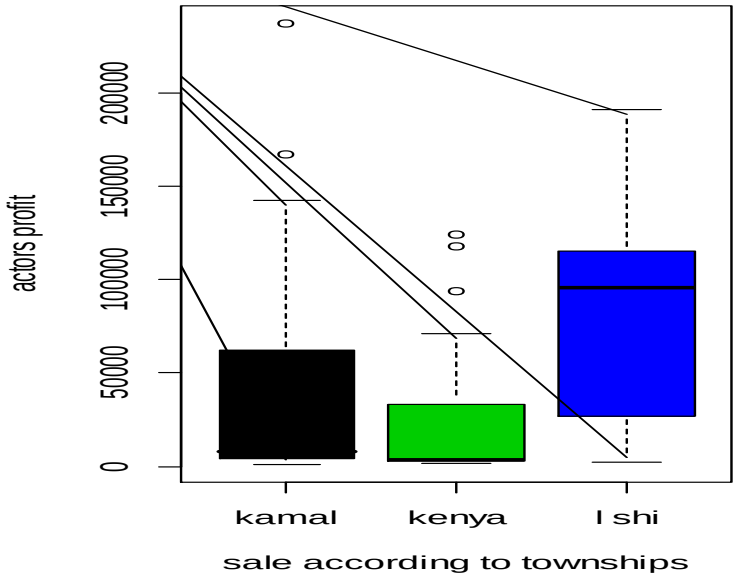

Figure 6. Weekly profit of actors according to their sales area

Regarding the financial profitability of the business, in spite of the profitability in both categories of restaurants on the sale of potato dishes, the highest rate of benefit was observed in one fork restaurants (322%), versus 204% in the zero fork restaurants. This difference is considered highly significant, according to the student test (p-value = 0.0001). This shows that the high unit price of a potato dish found in one Fork restaurants had greatly influenced the profit, regardless of the very high investment cost (Figure 7).

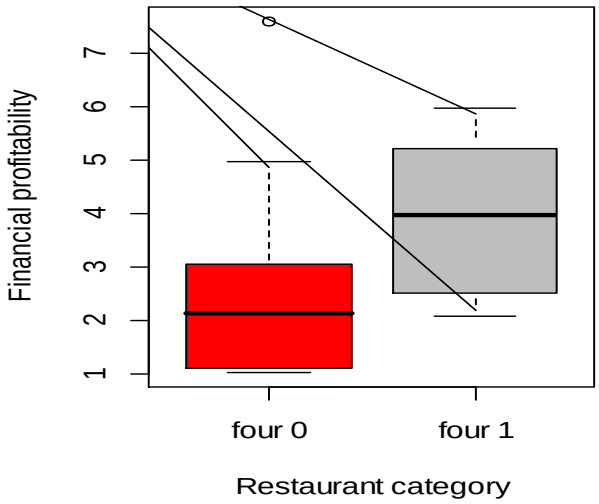

Figure 7. Financial profitability by type of restaurants

4. Discussions

This study conducted the economic assessment of potato sale consumed in Lubumbashi restaurant of zero and one fork category according to the criteria set by the ministerial ordinance in the official Journal of the Republic Democratic of Congo, first August 2015. The location of restaurant in a given township had an influence to the weekly profit of potato dish sale realized by the restaurant owners. Therefore, the restaurants owners located in Lubumbashi township achieved a high weekly profit in comparison to those located in other townships. The variance analysis shows differences highly significant (P=0.002). However, in addition to the unit price and capital invested, this high profit made by the sellers of the Lubumbashi township would be justified by a slightly high consumption. These trends in results were also observed by (Nkuku and Remon, 2006) in his study on Analysis by Potato Chain Approach in the Lubumbashi mining hinterland. Regarding the price of a 1kg potato dish ready for consumption in the surveyed restaurants, it was found that this price was high compared to that observed in Lubumbashi markets (around 3 dollars per kg), but this price was also very high compared to that fixed in the eastern markets of the country (the price of a Kg varies between 0.3 to 0.5 US dollars) according to CDE (2012). Several reasons explain this difference; According to FA0 (2009), in the east of DR Congo, potato cultivation is done throughout the year and 90% of the country's production are from the North and South Kivu. Although potato is also found in Haut Katanga province, its production is low and the daily consumption per Lubumbashi household is also reduced, since it does not constitute a staple food for the population of Lubumbashi. The Irish potato is still glamorous meal consumed occasionally in households, but very present in restaurants. The high selling price of this foodstuff in restaurants would also be explained by additional cost done by restaurant owners for processing potatoes before consumption.

The profitability rate is an indicator of the analysis of the financial profitability of an economic activity (Biaou, 2015); however, whether in terms of production, local or external marketing, vegetables are financially profitable and are likely to offer investment opportunities (Abdoulaye, 2003). In the case of this study, it should be underlined that the high financial profitability realized by the one fork restaurants owners was influenced by several factors, in particular the unit price, the capital invested and the quantity of potatoes consumed per day. In fact, according to the register of well classified restaurants at the level of the provincial ministry of tourism, the Lubumbashi commune harbors several restaurants with one fork, and it is in this same commune where it was

noted by Nkuku & al (2016) that, the frequency of potato consumption is relatively higher compared to other communes of Lubumbashi city. In the same line, Kamena (2004) adds that in Lubumbashi, the commercial function is considerable and is distributed in all the communes (Kamalondo, Rwashi, Kampemba, Lubumbashi, Kenya, Katuba and annex). And the commercial and administrative activities are more concentrated in the commune the Lubumbashi township and more precisely in the city center. This geographical position is the particularity that benefits the people who carry out economic activities in this commune (Lubumbashi).

Conclusion

The sale of potatoes for consumption in the zero and one fork restaurants in the current context of the capital of Upper Katanga province is an economically profitable activity. It is a response for a fringe of the population who deplores the food monotony of households in this city. However, it has been found that the daily consumption of potatoes in the restaurants concerned by this study does not vary according to the category; but remains slightly high in restaurants at one fork where a very high profit and a very high financial rate of revenue are observed. The unit price of sales and the invested capital had a positive influence on the category of one fork restaurants compared to the zero range restaurants. Thus, future studies on potato consumption in these restaurant categories should be conducted to analyze the socioeconomic profile of potential consumers, in a city where food takes on an essentially quantitative connotation.

References

[1]. VANDERHOFSTADT Bruno et JOUAN Bernard., 2009 : Guide technique de la culture de la pomme de terre en Afrique de l'Ouest, atelier sur la filière pomme de terre organisé par le Centre pour le Développement de l'Entreprise (CDE), Ouagadougou, pp3.

[2]. ROLOT Jean-Louis et VANDERHOFSTADT Bruno., 2014 : Guide technique de la culture de la pomme de terre en République démocratique du Congo, Centre pour le Développement de l'Entreprise (CDE), R. D. Congo, 104p.

[3]. FAO, 2009, deuxième rapport national de l'état des ressources phytogénétiquepour l'alimentation et l'agriculture, R D Congo, 66p.

[4]. Padilla M., Sid Ahmed Z., Wassef Habiba H. 2005:Agri. Med: agriculture, pêche, alimentation et développement rural durable dans la région méditerranéenne Rapport Annuel. CIHEAM, p. 249-269.

[5]. CDE, 2012, argumentaire pour la mise en place de crédits de campagne pour la filière pomme de terre au Bas-Congo,Dossier CDE N° RDC/1003/002.

[6]. PIERRE petit (éd), 2001, Lubumbashi : La situation des ménages dans une économie de précarité, Rapport de recherche effectuées durant la première session des travaux de l'observation de changement urbain en juin-octobre 2000, université de Lubumbashi, pp41-45-196.

[7]. Kamena M., Kasongo K., Kikunda K. & Mutete S., 2004. Approches de la criminalité dans la ville de Lubumbashi, Observatoire du Changement Urbain, UNILU.

[8]. Mpundu Mubemba Mulambi Michel, Useni Sikuzani Yannick, Ntumba Ndaye François,Muyambo Musaya Emmanuel, Kapalanga Kamina Prisca, Mwansa Muyembe, Ilunga Kampanyi, Nyembo Kimuni Luciens., 2013, évaluation des teneurs en éléments traces métalliques dans les légumes feuilles vendus dans les différents marchés de la zone minière de Lubumbashi, Journal of Applied Biosciences 66:5106– 5113.

[9]. F. Malaise., 1990, "la couverture végétale de Lubumbashi. In Bruneau J.C, Pain M., (Ed), Atlas de Lubumbashi",Edition publidix, Université de paris X-Nanterre, pp30-31.

[10]. I. Vranken, 2010, pollution et contamination des sols aux métaux dues à l'industrie métallurgique à Lubumbashi : Emprunte écologique, impact paysager, piste de gestion", mémoire de fin d'étude, Université Libre de Bruxelles, 90p.

[11]. C.Nkuku et M. Rémon, 2006, stratégie de survie à Lubumbashi (RD Congo), enquête sur 14000 ménages urbains, harmattan,p130.

[12]. Ministère de plan (2005), Monographie de la province du Katanga, draft 4, Kinshasa, p14.

[13]. Mujinga W., Lwamba, J., Mutala, S. et Hüsken, S.M.C., 2009, "Inventaire des espèces de poisson disponibles sur lesmarchés urbains de Lubumbashi, République Démocratique de Congo", Programme Régional les pêches et le VIH/SIDAen Afrique : Investir dans les solutions durables. The World Fish Center, Project Rapport 1982.

[14]. Nkulu Masengo Lucien, Tshomba Kalumbu John, Kesonga Nsele Maurice, Kabwe Kisebwe Mento, Bilolwa Bikalisha Pacifique, Dyanda Ngoy Elie1, Mulang Tshinish Sabin3, and Nkulu Mwine Fyama Jules.,2016, Analyse par l'approche filière de pomme de terre dans l'hin terland minier de Lubumbashi, International Journal of Innovation and Applied Studies, vol. 15, n° 3, Lubumbashi, pp. 573-582.

[15]. D. BIAOU, J. A. YABI, R. N. YEGBEMEY, and G. BIAOU., 2015. Performance technique et économique des pratiques culturales de gestionet de conservation de la fertilité en production maraîchère dans la commune de Malanville, nord Benin, International Journal of Innovation and Applied Studies, Vol. 21 n° 1, Benin, pp. 201-211.

[16]. D.Abdoulaye, 2003.Evaluation des filières d'exportation des fruits et légumes du Sénégal, mémoire de DEA, école nationale supérieure agronomique de montpellie, pp72.

[17]. M. kamena K., K.K. kilunda et S. Mutete, 2004. Approches de la criminalité dans la ville de Lubumbashi, observatoires du changement Urbain, Université de Lubumbashi, Lubumbashi, RDC, 168p.

[18]. I. Bombembu et B. Imba, 1991, «'' Contribution à l'étude de commercialisation des produits agricoles (manioc et maïs) dans lalocalité Widjifake-Mbandaka (Equateur) – Zaïre'', Tropicultura, pp 26-29.

[19]. Tshomba Kalumba John, Nyemba Mugalu Leopold, Ntumba Ndaye François, Mushagalusa Balasha Arsene, Muyambo Emmanuel, and Nkulu Mwine Fyama Jules, 2015, Le maraîchage et ses fonctions dans le contexte socioéconomique de Lubumbashi en R. D. Congo, international journal of innovation and applied stadies, Vol. 11 N°. 2, pp. 291-302.